

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
8 April 2004 (08.04.2004)

PCT

(10) International Publication Number  
**WO 2004/029270 A3**

- (51) International Patent Classification<sup>7</sup>: **C12P 17/12**,  
C12R 1/41 // (C12P 17/12, C12R 1:41)
- (21) International Application Number:  
PCT/EP2003/010296
- (22) International Filing Date:  
16 September 2003 (16.09.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
02021601.6 27 September 2002 (27.09.2002) EP
- (71) Applicant (for all designated States except US): **DSM IP ASSETS B.V.** [NL/NL]; Het Overloon 1, NL-6411 TE Heerlen (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **HOSHINO, Tatsuo** [JP/JP]; 2-18-14 Fueta, Kamakura-shi, Kanagawa-ken, Kanagawa 248-0027 (JP). **NAGATANI, Yoichiro** [JP/JP]; Daiya Haitzu Kamakura 2-216, Kamimachiya 550, Kamakura-shi, Kanagawa-ken, Kanagawa 247-0065 (JP). **ICHIKAWA, Kelko** [JP/JP]; Marin-terasu-nibankan 201, 3-8-14 Tsujido, Fujisawa-shi, Kanagawa-ken, Kanagawa 251-0047 (JP). **TAZOE, Masaaki** [JP/JP]; 5-14-22 Yokodai, Isogo-ku, Yokohama-shi, Kanagawa-ken, Kanagawa 235-0045 (JP).
- (74) Agents: **DR. KELLER, Günter** et al.; Lederer & Keller, Prinzregentenstrasse 16, 80538 München (DE).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
- with international search report
  - before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
  - with (an) indication(s) in relation to deposited biological material furnished under Rule 13bis separately from the description
- (88) Date of publication of the international search report:  
27 May 2004
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: PROCESS FOR PRODUCING VITAMIN B<sub>6</sub>

(57) Abstract: Disclosed is a mutant of a recombinant microorganism of the genus *Sinorhizobium* capable of producing vitamin B<sub>6</sub> having a recombinant plasmid with pdxJ gene that acquired histidine requirement of glycine resistance, or its combination thereof.



WO 2004/029270 A3

# INTERNATIONAL SEARCH REPORT

International Application No.

PCT/EP 03/10296

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 C12P17/12 C12R1/41 //(C12P17/12,C12R1:41)

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12P C12R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, MEDLINE, BIOSIS, FSTA, EMBASE

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	TAZOE M ET AL: "Production of vitamin B6 in Rhizobium" BIOSCIENCE BIOTECHNOLOGY BIOCHEMISTRY, vol. 63, no. 8, August 1999 (1999-08), pages 1378-1382, XP008026955 ISSN: 0916-8451 the whole document page 1381, right-hand column, line 21-26 ---	1,6
A	EP 0 765 938 A (HOFFMANN LA ROCHE) 2 April 1997 (1997-04-02) cited in the application the whole document examples 1,3,5-7 claims 1-10 ----- -/--	1,6

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*G\* document member of the same patent family

Date of the actual completion of the international search

5 March 2004

Date of mailing of the international search report

24/03/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

van de Kamp, M

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/10296

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 950 715 A (HOFFMANN LA ROCHE) 20 October 1999 (1999-10-20) the whole document	1,6
A	TAZOE M ET AL: "Biosynthesis of vitamin B6 in Rhizobium" JOURNAL OF BIOLOGICAL CHEMISTRY, vol. 275, no. 15, 14 April 2000 (2000-04-14), pages 11300-11305, XP002221306 ISSN: 0021-9258 cited in the application the whole document	1,6
A	LABER B ET AL: "Vitamin B6 biosynthesis: formation of pyridoxine 5'-phosphate from 4-(phosphohydroxy)-l-threonine and 1-deoxy-d-xylulose-5-phosphate by PdxA and PdxJ protein" FEBS LETTERS, vol. 449, no. 1, 16 April 1999 (1999-04-16), pages 45-48, XP004259528 ISSN: 0014-5793 the whole document	1,6
A	TAZOE M ET AL: "Biosynthesis of vitamin B6 in Rhizobium: In vitro synthesis of pyridoxine from 1-deoxy-D-xylulose and 4-hydroxy-L-threonine" BIOSCIENCE BIOTECHNOLOGY BIOCHEMISTRY, vol. 66, no. 4, April 2002 (2002-04), pages 934-936, XP008026954 ISSN: 0916-8451 the whole document	1,6
A	CAPELA D ET AL: "Analysis of the chromosome sequence of the legume symbiont Sinorhizobium meliloti strain 1021" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, vol. 98, no. 17, 2001, pages 9877-9882, XP002226725 ISSN: 0027-8424 abstract table 1	1,6

-/-

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/10296

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>GALIBERT F ET AL: "The composite genome of the legume symbiont <i>Sinorhizobium meliloti</i>."</p> <p>SCIENCE, vol. 293, no. 5530, 27 July 2001 (2001-07-27), pages 668-672, XP002272563 ISSN: 0036-8075 abstract table 1</p>	1,6
T	<p>DATABASE NCBI 'Online! NCBI; 13 January 2004 (2004-01-13) CAPELA D ET AL: "Probable pyridoxal phosphate biosynthetic protein (<i>Sinorhizobium meliloti</i>)"</p> <p>Database accession no. NP_386192 XP002272564 the whole document</p>	
T	<p>DATABASE NCBI 'Online! NCBI; 13 January 2004 (2004-01-13) CAPELA D ET AL: "Sinorhizobium meliloti 1021 complete genomes"</p> <p>Database accession no. NC_003047 XP002272565 the whole document</p>	
A	<p>MITTENHUBER G: "Phylogenetic analyses and comparative genomics of vitamin B6 (pyridoxine) and pyridoxal phosphate biosynthesis pathways"</p> <p>JOURNAL OF MOLECULAR MICROBIOLOGY AND BIOTECHNOLOGY, vol. 3, no. 1, January 2001 (2001-01), pages 1-20, XP008026190 ISSN: 1464-1801 abstract figure 1 page 7, right-hand column, line 20-43 figure 7; table 6</p>	

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/10296

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0765938	A	02-04-1997	EP 0765938 A2	02-04-1997
			AT 220107 T	15-07-2002
			CN 1153823 A ,B	09-07-1997
			DE 69622114 D1	08-08-2002
			DE 69622114 T2	27-02-2003
			DK 765938 T3	28-10-2002
			ES 2179141 T3	16-01-2003
			JP 9107985 A	28-04-1997
			US 5766894 A	16-06-1998
EP 0950715	A	20-10-1999	EP 0950715 A2	20-10-1999
			AU 2372799 A	28-10-1999
			BR 9902362 A	06-06-2000
			CA 2268539 A1	15-10-1999
			CN 1232875 A	27-10-1999
			ID 22473 A	21-10-1999
			JP 2000023690 A	25-01-2000
			NO 991738 A	18-10-1999
			US 6060267 A	09-05-2000